

What is claimed is:

1. A method for producing a decorative pre-impregnated  
5 sheet, comprising:

providing a decorative layer;

10 applying a mixture comprising a thermohardening  
synthetic resin and hard particles to the decorative  
layer;

15 applying a wax or a mixture of waxes having a melting  
range below a temperature of about 140°C to the  
decorative layer, or to the mixture, and

drying the applied mixture at a drying temperature above  
the melting range of the wax.

- 20 2. The method according to claim 1, further comprising  
pressing the decorative layer, the mixture and the wax  
in a hot press at a press temperature to form a  
laminate.

- 25 3. A method for producing a decorative laminate comprising:

providing a decorative layer,

30 applying a mixture comprising a thermohardening  
synthetic resin and hard particles to the decorative  
layer,

35 applying a wax or a mixture of waxes having a melting  
range below a temperature of about 140°C to the  
decorative layer or to the mixture, and

pressing the decorative layer, the mixture and the wax  
in a hot press at a press temperature to form a  
laminate.

40

4. The method according to one of claims 1 to 3, wherein the melting range of the wax is below a temperature of about 130°C, in particular below a temperature of about 120°C.

5

5. A method for producing a decorative laminate, comprising:

providing a decorative layer,

10

applying a mixture comprising at least a thermohardening synthetic resin and hard particles to the decorative layer,

15

applying a wax or mixture of waxes to the decorative layer or to the mixture, and

pressing the decorative layer, the mixture and the wax in a hot press at a press temperature to form a laminate,

20

wherein a melting range of the wax is by more than about 50°C below the press temperature.

- 25 6. A method for producing a decorative laminate board, comprising:

providing a decorative layer,

30

applying a mixture comprising a thermohardening synthetic resin and hard particles to the decorative layer,

applying at least one wax to the decorative layer or to the mixture,

35

arranging the decorative layer on a supporting substrate, and

pressing the supporting substrate, the decorative layer, the mixture and the wax in a hot press at a press temperature to form a decorative laminate board,

5 wherein a melting range of the at least one wax is at least one of below a temperature of about 140°C and by more than 50°C below the press temperature.

7. The method according to claim 6, wherein the decorative  
10 layer is disposed on at least one supporting layer before being arranged on the supporting substrate, wherein the supporting layer is arranged in between the supporting substrate and the decorative layer, and wherein the supporting layer is pressed together with  
15 the supporting substrate, the decorative layer and the mixture.

8. The method according to one of claims 6 or 7, wherein the supporting substrate comprises a stack of core  
20 papers.

9. The method according to one of claims 5 to 8, wherein the melting range is by more than 60°C, in particular by more than 70°C lower than the press temperature.

25 10. The method according to one of claims 2 to 9, wherein a dwell time in the press is from 4 to 60 seconds, preferably 5 to 20 seconds, more preferably 5 to 8 seconds.

30 11. The method according to one of claims 2 to 10, wherein a pressure of the press is less than 50 bars, preferably between 20 and 45 bars, and more preferably between 30 and 40 bars.

35 12. The method according to one of claims 2 to 11, wherein the press temperature is at least equal to or higher than a hardening temperature suitable for hardening the at least one synthetic resin.

13. The method according to one of claims 2 to 12, wherein the press temperature is in a range between about 180°C and about 240°C, in particular between about 200°C and 225°C, preferably above about 210°C.
14. The method according to one of the preceding claims, wherein the at least one wax has a melting viscosity of less than 75 mPa·s, in particular less than 50 mPa·s, preferably less than 30 mPa·s at the press temperature.
15. The method according to one of claims 2 to 14, further comprising drying the decorative layer with the applied mixture before the pressing, and at a drying temperature within a drying temperature range below the press temperature.
16. The method according to claim 15, wherein the drying is carried out until a remaining water content is 7% at most, in particular at least 6%.
17. The method according to claim 15 or 16, wherein the melting range of the wax is below the drying temperature.
18. The method according to one of claims 15 to 17, wherein the melting range of the wax is within the drying temperature range.
19. The method according to one of claims 15 to 18, wherein the drying temperature range is 140°C to 190°C.
20. The method according to claim 19, wherein during the drying, the drying temperature initially has an increasing temperature profile and thereafter a decreasing temperature profile.

21. The method according to one of claims 15 to 20, wherein a drying time is from 1 to 3 minutes, preferably from 1.5 to 2 minutes.
- 5 22. The method according to one of claims 1 to 21, wherein the application of the wax is carried out together with the application of the mixture.
23. The method according to claim 22, wherein the wax is a  
10 component of the mixture.
24. The method according to one of claims 1 to 23, wherein the melting range of the wax is above 60°C, preferably above 80°C.
- 15 25. The method according to one of claims 1 to 24, wherein an average molecular weight of the wax is between 600 and 1000 a.u., in particular between 800 and 1000 a.u.
- 20 26. The method according to one of the preceding claims, wherein providing the decorative layer comprises providing a decorative web.
27. The method according to claim 26, wherein providing the  
25 decorative layer further comprises applying a coating composition to the decorative web.
28. The method according to claim 27, wherein applying the mixture immediately follows applying the coating  
30 composition to the decorative web.
29. The method according to one of claims 26 to 28, wherein providing the decorative layer comprises providing a decorative web and a covering sheet, wherein the mixture  
35 is applied to at least the covering sheet.
30. The method according to claim 29, wherein at least the decorative web is impregnated with the coating composition.

31. The method according to claim 28 or 30, wherein the coating composition comprises the at least one synthetic resin but substantially no hard particles.

5

32. The method according to one of the preceding claims, wherein the mixture further comprises additives.

10

33. The method according to claim 32, wherein the additives comprise at least one of a surface active agent, hardener, modifying agent, catalyst, accelerator and separating agent.

15

34. The method according to one of the preceding claims, wherein at least 90% of the hard particles have a size below 80  $\mu\text{m}$ .

20

35. The method according to claim 34, wherein at least 90% of the hard particles have a size below 50  $\mu\text{m}$ .

25

36. The method according to claim 35, wherein at least 90% of the hard particles have a size between 10 and 50  $\mu\text{m}$ .

37. The method according to claim 34, wherein at least 90% of the hard particles have a size between 40 and 80  $\mu\text{m}$ , preferably between 60 and 80  $\mu\text{m}$ .

30

38. The method according to one of the preceding claims, wherein the thermohardening synthetic resin is a melamine resin.

35

39. The method according to one of the preceding claims, wherein the hard particles are aluminium oxide particles, in particular corundum particles.

40. The method according to one of the preceding claims, wherein the wax is a Fischer-Tropsch-Wax.

41. The method according to one of the preceding claims, wherein the at least one wax has a density in a range of from 0.90 to 0.99 kg/l.
- 5 42. The method according to claim 41, wherein at least one wax has a density in a range of 0.94 to 0.98 kg/l.
43. The method according to one of the preceding claims, wherein the at least one wax is comprised in the mixture  
10 in an amount of from 0.1 to 5 weight percent of the mixture.
44. The method according to claim 43, wherein the at least one wax is comprised in the mixture in an amount of 0.2  
15 to 3 weight percent.
45. The method according to claim 44, wherein the at least one wax is comprised in the mixture in an amount from 0.25 to 1.5 weight percent.  
20
46. A decorative, pre-impregnated sheet comprising:
- a decorative layer, and
- 25 a mixture applied to the decorative layer, the mixture comprising at least one thermohardening synthetic resin, hard particles, and at least one wax whose melting range is below a temperature of about 140°C, preferably below a temperature of about 130°C, and in particular below a  
30 temperature of about 120°C.
47. A decorative laminate, comprising:
- a decorative layer, and
- 35 a protective layer fixedly attached to the decorative layer, the protective layer comprising a mixture of at least one thermohardened synthetic resin, hard particles

and at least one wax, wherein a melting range of the wax is below a temperature of about 140°C.

- 5 48. The decorative laminate according to claim 47, wherein the melting range of the at least one wax is below a temperature of about 130°C, in particular below a temperature of about 120°C.
- 10 49. The decorative laminate according to claim 47 or 48, wherein the melting range of the at least one wax is substantially in a range of about 80°C to about 115°C.
- 15 50. The decorative laminate according to one of claims 47 to 49, wherein the at least one wax is a Fischer-Tropsch-Wax.
- 20 51. The decorative laminate according to one of claims 47 to 50, wherein the at least one wax has a melting viscosity of less than 100 mPa·s at a temperature of 5°C above the upper limit of its melting range.
- 25 52. The decorative laminate according to one of claims 47 to 51, wherein the at least one wax has a melting viscosity of less than 50 mPa·s at 5°C above the upper limit of its melting range.
- 30 53. The decorative laminate according to one of claims 47 to 52, wherein the hard particles are aluminium oxide particles, in particular corundum particles.
- 35 54. The decorative laminate according to one of claims 47 to 53, wherein at least 90% of the hard particles have a size of less than 80 µm.
55. The decorative laminate according to claim 54, wherein at least 90% of the hard particles have a size of less than 50 µm.



56. The decorative laminate according to claim 55, wherein at least 90% of the hard particles have a size between 10 and 50  $\mu\text{m}$ .
- 5 57. The decorative laminate according to claim 54, wherein at least 90% of the hard particles have a size between 40 and 80  $\mu\text{m}$ , preferably between 60 and 80  $\mu\text{m}$ .
- 10 58. The decorative laminate according to one of claims 47 to 57, wherein the mixture further comprises additives.
- 15 59. The decorative laminate according to one of claims 47 to 58, wherein the additives comprise at least one of surface active agent and modifying agent and separating agent.
- 20 60. The decorative laminate according to one of claims 47 to 59, wherein the hard particles are present in the mixture in an amount of from 5 to 65 weight percent.
- 25 61. The decorative laminate according to one of claims 47 to 60, wherein the hard particles are present in the mixture in an amount of from 15 to 50 weight percent.
- 30 62. The decorative laminate according to one of claims 47 to 61, wherein the at least one wax comprises an amount of from 0.11 to 5.5 weight percent of the mixture.
- 35 63. The decorative laminate according to one of claims 47 to 62, wherein the thermohardened synthetic resin is a melamine resin or a mixture of melamine resins.
64. The decorative laminate according to one of claims 47 to 63, wherein the decorative layer comprises a decorative web.
65. The decorative laminate according to claim 64, wherein the decorative layer further comprises a covering sheet.

66. The decorative laminate according to claim 64 or 65, wherein the decorative layer is a decorative web comprising a coating.
- 5 67. The decorative laminate according to claim 66, wherein the coating of the decorative web is substantially free from hard particles.
- 10 68. The decorative laminate according to claim 66, wherein the composition of the coating of the decorative web substantially corresponds to a composition of the protective layer of the decorative layer with the exception of the particles.
- 15 69. The decorative laminate according to one of claims 47 to 68, wherein the wax is accumulated on a surface of the laminate.
- 20 70. The decorative laminate according to claim 69, wherein a concentration of the wax in the protective layer has a negative gradient in a direction of a depth of the layer.
- 25 71. The decorative laminate according to one of claims 47 to 70, wherein out of all components, the wax forms the largest part of the mass in a surface of the laminate, in particular forms more than half of the mass.
- 30 72. The decorative laminate according to one of claims 47 to 71, wherein the melting range of the wax is above 60°C, preferably above 80°C.
- 35 73. The decorative laminate according to one of claims 47 to 72, wherein an average molecular weight of the wax is between 600 and 1000 a.u., in particular between 800 and 1000 a.u.

74. The decorative laminate according to one of claims 47 to 73, wherein an average thickness of the protective layer is between 20 and 30  $\mu\text{m}$ .

5 75. Decorative laminate board comprising a supporting substrate on which a decorative laminate according to one of claims 47 to 74 is arranged.

10 76. The decorative laminate board according to claim 75, wherein the supporting substrate is a high pressure laminate.

15 77. The decorative laminate board according to claim 75 or 76, wherein at least one side of the decorative laminate board has a tongue and groove profile.

78. Use of the decorative laminate board according to one of claims 75 to 77 as a floor covering.

20